

=> d hist

(FILE 'HOME' ENTERED AT 11:13:16 ON 20 JUL 2004)

FILE 'REGISTRY' ENTERED AT 11:13:28 ON 20 JUL 2004

	E N-PROPANE/CN
L1	1 S E3
	E ETHANE/CN
L2	1 S E3
	E METHANE/CN
L3	1 S E3
	E PROPYLENE/CN
L4	1 S E3
L5	1 S N-BUTANE/CN
L6	1 S ISOBUTANE/CN
L7	1 S PENTANE/CN
L8	1 S 1,1,1,2-TETRAFLUOROETHANE/CN
L9	1 S PENTAFLUOROETHANE/CN

FILE 'REGISTRY' ENTERED AT 11:16:34 ON 20 JUL 2004

FILE 'CAPLUS' ENTERED AT 11:16:47 ON 20 JUL 2004

L10 16 S (L1 OR L2 OR L3 OR L4) AND (L5 AND L6 AND L7) AND L8 AND L9

*DB=DWPI; PLUR=YES; OP=ADJ*

<u>L9</u>	us-6428720-\$.did.	1	<u>L9</u>
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<u>L8</u>	us-6508950-\$.did.	1	<u>L8</u>
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*DB=USPT; PLUR=YES; OP=ADJ*

<u>L7</u>	r-601	1	<u>L7</u>
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<u>L6</u>	r-1270	4	<u>L6</u>
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<u>L5</u>	r-134a and r-290	14	<u>L5</u>
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<u>L4</u>	L2 and refrigerant	7	<u>L4</u>
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<u>L3</u>	L2 and 134a	0	<u>L3</u>
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<u>L2</u>	rhodia.as.	477	<u>L2</u>
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<u>L1</u>	tieken.in.	11	<u>L1</u>
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END OF SEARCH HISTORY

Reg/ CAT 7/20/04

Please note that search-term pricing does apply when conducting SmartSELECT searches.

Crossover limits have been increased. See HELP CROSSOVER for details.

Experimental and calculated property data are now available. For more information enter HELP PROP at an arrow prompt in the file or refer to the file summary sheet on the web at:

<http://www.cas.org/ONLINE/DBSS/registryss.html>

=> e n-propane/cn

E1	1	N-PROPAN-3-OL-N-METHYLANILINE/CN
E2	1	N-PROPANAL/CN
E3	1 -->	N-PROPANE/CN
E4	1	N-PROPANENITRILE/CN
E5	1	N-PROPANESULFONAMIDE/CN
E6	1	N-PROPANESULFONATE/CN
E7	1	N-PROPANESULFONYL CHLORIDE/CN
E8	1	N-PROPANESULFONYL- (S) -4- (METHYLSULFANYL) BUTYRAMIDE/CN
E9	1	N-PROPANETHIOL/CN
E10	1	N-PROPANOL/CN
E11	1	N-PROPANOL ACETATE/CN
E12	1	N-PROPANOL BUTYRATE/CN

=> s e3

L1 1 N-PROPANE/CN

=> e ethane/cn

E1	1	ETHANAMINIUM-2-14C, N,N,N-TRIMETHYL-2-OXO-2- (TETRADECYL-9,10 -T2-OXY) -, CHLORIDE/CN
E2	1	ETHANANMINE, N- (2,2-DINITROETHYL) -2,2-DINITRO-, ION(1-), POT ASSIUM/CN
E3	1 -->	ETHANE/CN
E4	1	ETHANE 1,2-BIS (METHYLPHOSPHINIC ACID) /CN
E5	1	ETHANE AZOMETHANE, DIOXIDE/CN
E6	1	ETHANE CATION RADICAL/CN
E7	1	ETHANE DIAMINE N,N'-BIS (2-THIENYL METHYLENE) /CN
E8	1	ETHANE DIBROMIDE-TETRABROMOBISPHENOL A COPOLYMER/CN
E9	1	ETHANE DIMETHANESULFONATE/CN
E10	1	ETHANE HEXACHLORIDE/CN
E11	1	ETHANE ION (1+) /CN
E12	1	ETHANE ION (2+) /CN

=> s e3

L2 1 ETHANE/CN

=> e methane/cn

E1	1	METHANDROSTENOLONE GLUCURONIDE/CN
E2	1	METHANDROSTENOLONE SULFATE/CN
E3	1 -->	METHANE/CN
E4	1	METHANE (11CH4) /CN
E5	1	METHANE (13CD4) /CN
E6	1	METHANE (13CH2D2) /CN
E7	1	METHANE (13CH3D) /CN
E8	1	METHANE (13CH4) /CN
E9	1	METHANE (13CHD3) /CN
E10	1	METHANE (CD2T2) /CN
E11	1	METHANE (CD3H+) /CN
E12	1	METHANE (CD4) /CN

=> s e3

L3 1 METHANE/CN

```
=> e propylene/cn
E1      1      PROPYLDOPAMINE HYDROCHLORIDE/CN
E2      1      PROPYLEINE/CN
E3      1  --> PROPYLENE/CN
E4      1      PROPYLENE ACETAL/CN
E5      1      PROPYLENE ACETATE/CN
E6      1      PROPYLENE ACRYLATE/CN
E7      1      PROPYLENE BIS(DIETHYL ORTHOACETATE)/CN
E8      1      PROPYLENE BIS(PROPYLENE CYCLIC ORTHOACETATE)/CN
E9      1      PROPYLENE BORATE/CN
E10     1      PROPYLENE BORATE, ((C3H6O2)BO)2(C3H6)/CN
E11     1      PROPYLENE BORATE, ANHYDRIDE WITH (PHO)2(HO)PO/CN
E12     1      PROPYLENE BROMOHYDRIN/CN
```

```
=> s e3
L4      1 PROPYLENE/CN
```

```
=> s n-butane/cn
L5      1 N-BUTANE/CN
```

```
=> s isobutane/cn
L6      1 ISOBUTANE/CN
```

```
=> s pentane/cn
L7      1 PENTANE/CN
```

```
=> s 1,1,1,2-tetrafluoroethane/cn
L8      1 1,1,1,2-TETRAFLUOROETHANE/CN
```

```
=> s pentafluoroethane/cn
L9      1 PENTAFLUOROETHANE/CN
```

```
=> file reg
COST IN U.S. DOLLARS          SINCE FILE      TOTAL
                               ENTRY      SESSION
FULL ESTIMATED COST          41.97      42.18
```

FILE 'REGISTRY' ENTERED AT 11:16:34 ON 20 JUL 2004  
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Property values tagged with IC are from the ZIC/VINITI data file  
 provided by InfoChem.

STRUCTURE FILE UPDATES: 19 JUL 2004 HIGHEST RN 713066-32-1  
 DICTIONARY FILE UPDATES: 19 JUL 2004 HIGHEST RN 713066-32-1

TSCA INFORMATION NOW CURRENT THROUGH JANUARY 6, 2004

Please note that search-term pricing does apply when  
 conducting SmartSELECT searches.

Crossover limits have been increased. See HELP CROSSOVER for details.

Experimental and calculated property data are now available. For more  
 information enter HELP PROP at an arrow prompt in the file or refer  
 to the file summary sheet on the web at:  
<http://www.cas.org/ONLINE/DBSS/registryss.html>

```
=> file caplus
COST IN U.S. DOLLARS          SINCE FILE      TOTAL
                               ENTRY      SESSION
FULL ESTIMATED COST          0.42      42.60
```

FILE 'CAPLUS' ENTERED AT 11:16:47 ON 20 JUL 2004  
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FILE COVERS 1907 - 20 Jul 2004 VOL 141 ISS 4  
FILE LAST UPDATED: 19 Jul 2004 (20040719/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d hist

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	E N-PROPANE/CN
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L7	1 S PENTANE/CN
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L9	1 S PENTAFLUOROETHANE/CN

FILE 'REGISTRY' ENTERED AT 11:16:34 ON 20 JUL 2004

FILE 'CAPLUS' ENTERED AT 11:16:47 ON 20 JUL 2004

=> s (l1 or l2 or l3 or l4) and (l5 and l6 and l7) and l8 and l9

32104	L1
29859	L2
106167	L3
38698	L4
23743	L5
13708	L6
17107	L7
4530	L8
1810	L9

L10 16 (L1 OR L2 OR L3 OR L4) AND (L5 AND L6 AND L7) AND L8 AND L9

=> d all 1-16

L10 ANSWER 1 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2004:333796 CAPLUS  
DN 140:323485

ED Entered STN: 23 Apr 2004  
 TI Refrigerant blend compositions  
 IN Chambers, Owen Ross; Roberts, Neil Andre  
 PA Rhodia Organique Fine Limited, UK  
 SO PCT Int. Appl., 28 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM C09K005-04  
 CC 48-5 (Unit Operations and Processes)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004033582	A1	20040422	WO 2003-GB4421	20031013
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				

PRAI GB 2002-23724 A 20021011

AB Refrigerant composition are disclosed which comprises: (a) pentafluoroethane, trifluoromethoxydifluoromethane or hexafluorocyclopropane, or a mixture of two or more thereof, in an amount of at least 75% based on the weight of the composition, (b) 1,1,1,2,2 or 1,1,2,2-tetrafluoroethane, trifluoromethoxypentafluoroethane, 1,1,1,2,2,3,3-heptafluoropropane or a mixture of two or more thereof, in an amount of from 10 to 20% by weight based on the weight of the composition and (c) an ethylenically unsatd. or saturated hydrocarbon, optionally containing one or more oxygen atoms, with a b.p. from -50° to +35°, or a mixture thereof in an amount from 1% to 4% by weight based on the weight of the composition the weight ratio of component

(a): component (b) being at least 4:1.

ST refrigerant blend fluorocarbon ether hydrocarbon thermodyn efficiency PVT

IT Ethers, uses

Hydrocarbons, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(b.p. -50° to 35°C; refrigerant blend comps.)

IT Dew point

(design parameter for evaporator; refrigerant blend comps.)

IT Hydrocarbons, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP

(Physical process); TEM (Technical or engineered material use); PROC

(Process); USES (Uses)

(fluoro, b.p. <40°, refrigerant component; refrigerant blend comps.)

IT Climate

(greenhouse effect, refrigerant replacements to mitigate; refrigerant blend comps.)

IT Bubble point

Equation of state

Refrigerants

Thermodynamic cycle

(refrigerant blend comps.)

IT Hydrocarbons, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(unsatd., b.p. -50° to 35°C; refrigerant blend comps.)

IT Vapor pressure

(vs. temperature of refrigerants; refrigerant blend compns.)

IT 354-33-6  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (R 125, refrigerant component; refrigerant blend compns.)

IT 811-97-2, 1,1,1,2-Tetrafluoroethane  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (R 134a, refrigerant component; refrigerant blend compns.)

IT 2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (R 227ca, refrigerant component; refrigerant blend compns.)

IT 106-97-8, Butane, processes  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (R 600, refrigerant component; refrigerant blend compns.)

IT 75-28-5, Isobutane  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (R 600a; refrigerant blend compns.)

IT 3822-68-2, Trifluoromethoxydifluoromethane  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (R-E 125, refrigerant component; refrigerant blend compns.)

IT 158675-78-6, R 407C  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (blend of R 125, R 134a, and R 32 (difluoromethane); refrigerant blend compns.)

IT 150743-07-0, R 404A  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (refrigerant blend compns.)

IT 74-98-6, Propane, uses 75-19-4, Cyclopropane 75-46-7, Trifluoromethane 78-78-4, Isopentane 109-66-0, Pentane, uses 115-07-1, Propene, uses 115-10-6, Dimethyl ether 287-23-0, Cyclobutane 503-30-0, Oxetan 540-67-0, Ethyl methyl ether 594-11-6, Methylcyclopropane 665-16-7, Trifluoromethoxypentafluoroethane  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (refrigerant component; refrigerant blend compns.)

IT 75-45-6, R 22  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (refrigerant; refrigerant blend compns.)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Forbes, P; WO 9508602 A 1995 CAPLUS
- (2) Honeywell Int Inc; WO 0226912 A 2002 CAPLUS
- (3) Rhodia Ltd; GB 2356867 A 2001 CAPLUS
- (4) Sanyo Electric Co; EP 0659862 A 1995 CAPLUS
- (5) Victor, T; WO 0123493 A 2001 CAPLUS

L10 ANSWER 2 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2004:269679 CAPLUS

DN 140:289492

ED Entered STN: 02 Apr 2004

TI Fluorocarbon-hydrocarbon refrigerant blend

IN Tieken, James B.

PA USA  
 SO U.S. Pat. Appl. Publ., 8 pp.  
 CODEN: USXXCO  
 DT Patent  
 LA English  
 IC ICM F25D001-00  
 ICS C09K005-00  
 NCL 252067000  
 CC 48-5 (Unit Operations and Processes)  
 Section cross-reference(s): 51, 59

*applicant*

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004061091	A1	20040401	US 2003-672505	20030926
	WO 2004031318	A1	20040415	WO 2003-US30474	20030926
	W:				
	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW:				
	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				

PRAI US 2002-415340P P 20021001

AB A refrigerant blend is described for replacing refrigerant R-22 (chlorodifluoromethane) in refrigeration systems designed to use R-22 as the refrigerating fluid. The refrigerant blend comprises R-134a (1,1,1,2-tetrafluoroethane), R-125 (pentafluoroethane), a hydrocarbon component, and, optionally, R-32 (difluoromethane). The hydrocarbon component comprises  $\geq 2$  hydrocarbons having b.ps. that bracket the b.p. of R-134a ( $-15^{\circ}\text{F}$ ,  $-26^{\circ}\text{C}$ ). The hydrocarbons in one group, designated as Group A, have b.ps. lower than the b.p. of R-134a. The hydrocarbons in the other group, designated Group B, have b.ps. higher than that of R-134a.

ST fluorocarbon hydrocarbon refrigerant blend

IT Hydrocarbons, uses

RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)

(fluoro; fluorocarbon-hydrocarbon refrigerant blend)

IT Air conditioning

Refrigerants

Refrigeration

(fluorocarbon-hydrocarbon refrigerant blend)

IT Hydrocarbons, uses

RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)

(fluorocarbon-hydrocarbon refrigerant blend)

IT 109-66-0, Pentane, uses

RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)

(R-601; fluorocarbon-hydrocarbon refrigerant blend)

IT 74-82-8, R-50, uses 74-84-0, R-170, uses 74-98-6

, R-290, uses 75-10-5, R-32 75-28-5, R-600a 106-97-8

, R-600, uses 115-07-1, R-1270, uses 354-33-6, R-125

811-97-2, R-134a

RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)

(fluorocarbon-hydrocarbon refrigerant blend)

L10 ANSWER 3 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2004:119646 CAPLUS



DN 140:148447  
 ED Entered STN: 13 Feb 2004  
 TI Environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture  
 mixture for centrifugal compressors  
 IN Poole, John Edward; Powell, Richard; Thomas, James Victor  
 PA Refrigerant Products Ltd., UK  
 SO U.S. Pat. Appl. Publ., 4 pp.  
 CODEN: USXXCO  
 DT Patent  
 LA English  
 IC ICM C09K005-00  
 NCL 252067000  
 CC 48-5 (Unit Operations and Processes)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004026655	A1	20040212	US 2003-393203	20030318
PRAI	GB 2002-6413	A	20020319		
AB	An environmentally friendly hydrofluorocarbon refrigerant for centrifugal compressors consist of a mixture of R134a (1,1,1,2-tetrafluoroethane), R 227ea (1,1,1,2,3,3,3-heptafluoropropane), optionally R 125 (pentafluoroethane), and $\leq 6.5$ weight% (preferably 2-5 weight%) of a hydrocarbon component selected from butane, isobutane, propane, cyclopentane, isopentane, neopentane, and pentane. The refrigerant mixts. are suitable replacements for R 12 (dichlorodifluoromethane) refrigerant and are characterized by a maximum vapor pressure of $\leq 2$ bar greater than that of R 12 at 45° and an average mol. weight of 121.				
ST	hydrofluorocarbon refrigerant centrifugal compressor; fluoroethane perfluoropropane isobutane refrigerant centrifugal compressor				
IT	Compressors (centrifugal; environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture mixture for centrifugal compressors)				
IT	Refrigerants (environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture mixture for centrifugal compressors)				
IT	Hydrocarbons, uses RL: TEM (Technical or engineered material use); USES (Uses) (fluoro, mixts. with hydrocarbons; environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture mixture for centrifugal compressors)				
IT	Hydrocarbons, uses RL: TEM (Technical or engineered material use); USES (Uses) (mixts. with hydrofluorocarbons; environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture mixture for centrifugal compressors)				
IT	74-98-6, Propane, uses 75-28-5, Isobutane 78-78-4, Isopentane 106-97-8, Butane, uses 109-66-0, Pentane, uses 287-92-3, Cyclopentane 463-82-1, Neopentane RL: TEM (Technical or engineered material use); USES (Uses) (mixts. with hydrofluorocarbons; environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture mixture for centrifugal compressors)				
IT	354-33-6, Pentafluoroethane 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane RL: TEM (Technical or engineered material use); USES (Uses) (mixts.; environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture mixture for centrifugal compressors)				
IT	652129-13-0 RL: TEM (Technical or engineered material use); USES (Uses) (refrigerant; environmentally friendly hydrofluorocarbon-hydrocarbon refrigerant mixture mixture for centrifugal compressors)				

DN 140:28897  
 ED Entered STN: 16 Oct 2003  
 TI Modelling enthalpy and entropy of pure and mixed refrigerants with an innovative corresponding states method  
 AU Scalabrin, G.; Grigianti, M.; Cristofoli, G.  
 CS Dipartimento di Fisica Tecnica, Universita di Padova, Padua, I-35131, Italy  
 SO International Journal of Refrigeration (2003), 26(8), 936-950  
 CODEN: IJRFDI; ISSN: 0140-7007  
 PB Elsevier Science Ltd.  
 DT Journal  
 LA English  
 CC 48-5 (Unit Operations and Processes)  
 Section cross-reference(s): 69  
 AB In this work an original improvement of the corresponding states technique is developed and a new model, based on a three parameters CS format, is proposed to predict the enthalpy and the entropy of the new generation halogenated alkanes fluids together with some alkanes. Limiting the anal. of the selected fluids to a specific thermodyn. property behavior, an appropriate conformality approach can be deduced, which allows to set up a predictive model of high accuracy level on a wide range of the enthalpy and entropy surfaces. The fundamentals of the model are innovative scaling parameters deduced from the enthalpy of vaporization and from two dedicated equations, belonging to the selected family of fluids. This allows to set up innovative models following a CS format. Through the introduction of advanced mixing rules, the models can be simply extended to calculate the corresponding properties for mixts. The proposed models allow also the calcn. of VLE for systems of rather regular behavior. The required inputs for a pure target fluid are an ideal gas isobaric heat capacity correlation, a single value of saturated liquid d. and of vaporization enthalpy; if the last one is lacking, a single value of vapor pressure can be alternatively supplied. For non-azeotropic mixts. the enthalpy and entropy models are predictive, whereas in case of azeotropy VLE calcns. are possibly only applying regressed interaction coeffs. Due to the lack of accurate exptl. enthalpy data and to the particular nature of the entropy function, the validation of the models is proposed against fundamental dedicated EoS available, both for pure and mixts., for a significant number of the studied family of fluids. The predictive character of the proposed approach as well as the high performances reached, make these models particularly suitable for the new families of fluids regarding advanced technol. applications.  
 ST refrigerant enthalpy entropy modeling corresponding state; halogenated alkane refrigerant enthalpy entropy modeling  
 IT Corresponding states  
 Enthalpy  
 Entropy  
 Refrigerants  
 Simulation and Modeling, physicochemical  
 (modeling of enthalpy and entropy of pure and mixed halogenated alkane refrigerants with corresponding states method)  
 IT Alkanes, properties  
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (modeling of enthalpy and entropy of pure and mixed halogenated alkane refrigerants with corresponding states method)  
 IT 74-82-8, Methane, properties 74-84-0, Ethane, properties 74-98-6, Propane, properties 75-10-5, R32, Refrigerant 75-28-5, Iso-butane 75-37-6, R152a 75-45-6 75-68-3, R142b 75-69-4, R11, Refrigerant 75-71-8, R12, Refrigerant 76-14-2 78-78-4, Iso-pentane 106-97-8, n-Butane, properties 109-66-0, n-Pentane, properties 110-54-3, Hexane, properties 142-82-5, Heptane, properties 306-83-2, R123 354-33-6, R125 811-97-2, R134a  
 RL: PRP (Properties); TEM (Technical or engineered material use); USES

150743-07-0, R-404A    158675-77-5, R-406A    158675-78-6, R-407A  
 158675-79-7, R-408A    164671-97-0, R 405A    174819-20-6, R-411A  
 188653-05-6, R-413A    406214-80-0, R 412A    406214-81-1, R 509A

RL: TEM (Technical or engineered material use); USES (Uses)

(refrigerant; fluorocarbon refrigerant compns.)

IT 60-29-7, Ethyl ether, uses 74-82-8, Methane, uses  
 74-84-0, Ethane, uses 74-85-1, Ethylene, uses 74-98-6,  
 Propane, uses 75-28-5, Isobutane 75-37-6, 1,1-Difluoroethane  
 78-78-4, Isopentane 106-97-8, Butane, uses 107-31-3, Methyl  
 formate 109-66-0, Pentane, uses 115-07-1, Propylene,  
 uses 115-10-6, Dimethyl ether 124-38-9, Carbon dioxide, uses  
 287-92-3, Cyclopentane 353-36-6, Fluoroethane 463-82-1, Neopentane  
 2314-97-8, Iodotrifluoromethane 2551-62-4, Sulfur hexafluoride  
 3822-68-2, Pentafluorodimethyl ether 25190-06-1, Polybutylene glycol  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (solubilizing agent; fluorocarbon refrigerant compns.)

L10 ANSWER 6 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:145516 CAPLUS

DN 136:265205

ED Entered STN: 26 Feb 2002

TI A corresponding states predictive viscosity model based on a new scaling  
 parameter: application to hydrocarbons, halocarbons and mixtures

AU Scalabrin, G.; Cristofoli, G.; Grigiente, M.

CS Dipartimento di Fisica Tecnica, Universita di Padova, Padova, I-35131,  
 Italy

SO International Journal of Energy Research (2002), 26(1), 1-26

CODEN: IJERDN; ISSN: 0363-907X

PB John Wiley & Sons Ltd.

DT Journal

LA English

CC 48-11 (Unit Operations and Processes)

AB A three-parameter corresponding states (CS) model is developed, importing  
 methods formerly studied for the volumetric representation of fluids. The  
 three parameters are critical temperature, pressure and a viscosity scaling  
 factor,

$\psi$ , defined from exptl. saturated liquid viscosity data or, when these are  
 unavailable, from a single exptl. point. Two reference fluids are chosen both  
 for their  $\psi$  factor value and because the corresponding viscosity  
 dedicated equations (VDE) are available. On the basis of the  
 three-parameter CS model proposed by A. S. Teja (1980) for volumetric  
 properties, the reduced viscosity of a third fluid is obtained in reduced  
 P, T variables interpolating that of the two reference fluids, calculated at

the

same reduced temperature and pressure. by  $\psi$ . Where the transport property  
 is known along the saturation line at least, an improvement is introduced by  
 correcting the  $\psi$  factor with a temperature-dependent function fitted on  
 these data. The model is then extended to mixts. using the one-fluid  
 model approach, in a completely predictive mode with respect to the mixture  
 The accuracy for both pure fluids and mixts. is comparable with that of  
 the reference fluids' equations, while in the unimproved and improved mode the  
 amount of input data is very limited. Also, comparison with a  
 four-parameter CS model and with an ECS model confirms the accuracy of the  
 present technique. Considering the predictive nature of the model and the  
 scattering of the available exptl. data. the mean accuracy is good and  
 more than satisfactory for the purposes of tech. applications.

ST hydrocarbon mixt corresponding state predictive viscosity model scaling  
 parameter; halocarbon mixt corresponding state predictive viscosity model  
 scaling parameter

IT Corresponding states

Viscosity

(applications of corresponding states predictive viscosity model based  
 on scaling parameter to hydrocarbons and halocarbons and mixts.)

IT Hydrocarbons, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)  
(applications of corresponding states predictive viscosity model based on scaling parameter to hydrocarbons and halocarbons and mixts.)

IT Hydrocarbons, processes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)  
(halo; applications of corresponding states predictive viscosity model based on scaling parameter to hydrocarbons and halocarbons and mixts.)

IT 71-43-2, Benzene, processes 74-82-8, Methane, processes 74-84-0, Ethane, processes 74-98-6, Propane, processes 75-10-5, R32, Refrigerant 75-28-5, Isobutane 75-37-6, R152a 75-45-6 106-97-8, n-Butane, processes 109-66-0, n-Pentane, processes 110-54-3, n-Hexane, processes 111-65-9, n-Octane, processes 112-40-3, n-Dodecane 124-18-5, n-Decane 142-82-5, n-Heptane, processes 306-83-2, R123 354-33-6, R125 359-35-3, R134 420-46-2, R143a 431-63-0, R236Ea 811-97-2, R134a 1717-00-6, R141b 2837-89-0, R124

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)  
(applications of corresponding states predictive viscosity model based on scaling parameter to hydrocarbons and halocarbons and mixts.)

RE.CNT 101 THERE ARE 101 CITED REFERENCES AVAILABLE FOR THIS RECORD  
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L10 ANSWER 7 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2001:185836 CAPLUS

DN 134:223769

ED Entered STN: 16 Mar 2001

TI Insulating extruded foams having monovinyl aromatic polymers with a broad molecular weight distribution and their manufacture

IN Duffy, John D.; Vo, Chau V.; Mason, Jeffrey J.; Paquet, Andrew N.

PA Dow Chemical Co., USA

SO PCT Int. Appl., 20 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C08J009-14

ICS C08J009-00

CC 38-3 (Plastics Fabrication and Uses)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001018098	A1	20010315	WO 2000-US24115	20000901
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
EP 1214372	A1	20020619	EP 2000-957943	20000901
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				

	TR 200200531	T2	20020621	TR 2002-20020053120000901
	JP 2003508613	T2	20030304	JP 2001-522316 20000901
	NO 2002001038	A	20020430	NO 2002-1038 20020301

PRAI US 1999-152530P P 19990903  
US 1999-152845P P 19990908  
US 1999-153320P P 19990910  
WO 2000-US24115 W 20000901

AB Title closed-cell foams show a thermal conductivity (TC; based on EN-13164) of  $\leq 35$  mW/m-°K. and comprise (a) polymers containing  $\geq 50\%$  monovinyl aromatic monomers and having an weight-average mol. weight of (Mw) 130,000-400,000 and polydispersity (Mw/Mn) of  $\geq 2.5$  and (b) blowing agent residues from mixts. of 30-90% fluoro hydrocarbons as primary blowing agents (optionally and 0-50% CO<sub>2</sub>) and 10-70% secondary blowing agents selected from C1-4 alcs., C1-5 linear or cyclic hydrocarbons, alkyl halides, and water. A polystyrene with Mw of 150,000 and Mw/Mn of 3.29 was extruded along with 10 phr blowing agent (6.9:0.6:2.5 HFC 134A, CO<sub>2</sub>, and EtOH) gave a foam with d. 37.8 kg/m<sup>3</sup>, cell size 0.21 mm, open cell content 1.8%, and TC 28.6 mW/m-°K.

ST thermal insulator foam styrene polymer broad mol wt distribution; blowing agent blend manuf styrene resin foam thermal insulator

IT Alcohols, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(C1-4; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Hydrocarbons, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(C1-5; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Carbon black, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(IR attenuator; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Hydrocarbons, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(fluoro; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Blowing agents  
Polydispersity  
Thermal insulators  
(high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Alkyl halides  
RL: MOA (Modifier or additive use); USES (Uses)  
(high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Vinyl compounds, uses  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(polymers, aromatic; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT 7782-42-5, Graphite, uses 13463-67-7, Titania, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(IR attenuator; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT 7429-90-5, Aluminum, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(flake, IR attenuator; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, Isopropanol, uses 71-23-8, n-Propanol, uses 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-98-6, Propane, uses 75-10-5, HFC 32 75-28-5, Isobutane 75-37-6, HFC 152A 75-73-0, Perfluoromethane 76-16-4, Perfluoroethane 76-19-7, Perfluoropropane 78-78-4, Isopentane 106-97-8, n-Butane, uses 109-66-0,

n-Pentane, uses 115-25-3, Perfluorocyclobutane 124-38-9, Carbon dioxide, uses 287-23-0, Cyclobutane 287-92-3, Cyclopentane 353-36-6, HFC 161 354-33-6, HFC 125 355-25-9, Perfluorobutane 359-35-3, HFC 134 406-58-6, HFC 365mfc 420-46-2, HFC 143A 421-07-8, HFC 263fb 430-61-5, HFC 272fb 431-89-0, HFC227ea 460-73-1, HFC 245fa 463-82-1, Neopentane 593-53-3, Methyl fluoride 811-97-2, HFC 134A 2252-84-8, Heptafluoropropane 7732-18-5, Water, uses

RL: MOA (Modifier or additive use); USES (Uses)

(high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT 9003-53-6, Polystyrene

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (2) Basf Ag; EP 0543242 A 1993 CAPLUS
- (3) Leduc, E; US 5149473 A 1992 CAPLUS
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L10 ANSWER 8 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2000:238061 CAPLUS

DN 132:280158

ED Entered STN: 13 Apr 2000

TI Foams having increased heat distortion temperature from blends of alkenyl aromatic polymers

IN Chaudhary, Bharat I.; Barry, Russell P.; Ciriha, Stephanie C.

PA Dow Chemical Co., USA

SO U.S., 18 pp.

CODEN: USXXAM

DT Patent

LA English

IC ICM C08J009-00

ICS B29D067-00; B32B003-26

NCL 521081000

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 35

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6048909	A	20000411	US 1998-206058	19981204
	WO 2000034364	A1	20000615	WO 1999-US27114	19991115
	W:	AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
	EP 1137697	A1	20011004	EP 1999-959001	19991115
	R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO			
	TR 200102274	T2	20020221	TR 2001-200102274	19991115
	JP 2002531657	T2	20020924	JP 2000-586805	19991115
	NO 2001002692	A	20010709	NO 2001-2692	20010531
PRAI	US 1998-206058	A2	19981204		
	WO 1999-US27114	W	19991115		

AB The present invention pertains to improved alkenyl aromatic polymer foams (and processes for their preparation) having increased heat distortion temperature



and improved dimensional stability while maintaining good tensile/tear, creep and environmental dimensional change properties. The closed cell low d. alkenyl aromatic polymer foams exhibit increased heat distortion temperature, when substantially random interpolymers of about 21 to about 65 mol % styrene are blended in. The foams contain alkenyl aromatic polymers and copolymers of vinyl aromatic monomers and/or vinyl (cyclo)aliphatic monomers and  $\alpha$ -olefins. When these same alkenyl aromatic polymer foams are made without these interpolymers, the heat distortion temperature is not improved.

A blend contained polystyrene and ethylene-styrene copolymer (prepared using (1H-cyclopenta[1]phenanthrene-2-yl)dimethyl(t-butylamido)-silanetitanium 1,4-diphenylbutadiene catalyst).

ST polystyrene ethylene styrene copolymer foam  
IT Air  
(blowing agent; foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT Plastic foams  
RL: TEM (Technical or engineered material use); USES (Uses)  
(foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, 2-Propanol, uses 71-23-8, n-Propanol, uses 71-55-6, 1,1,1-Trichloro-ethane 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-87-3, Methyl chloride, uses 74-98-6, Propane, uses 75-00-3, Ethyl chloride 75-09-2, Methylene chloride, uses 75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC-152a 75-45-6, HCFC-22 75-68-3, HCFC-142b 75-69-4, CFC-11 75-71-8, CFC-12 75-73-0, Perfluoromethane 76-13-1, CFC-113 76-14-2, CFC-114 76-16-4, Perfluoroethane 76-19-7, Perfluoropropane 77-92-9, uses 78-67-1, Azodiisobutyro-nitrile 78-78-4, Isopentane 80-17-1 106-97-8, n-Butane, uses 109-66-0, Pentane, uses 115-25-3, Perfluorocyclobutane 123-77-3, Azodicarbonamide 124-38-9, Carbon dioxide, uses 133-55-1, N,N'-Dimethyl-N,N'-dinitrosotere-phthalamide 144-55-8, Sodium bicarbonate, uses 306-83-2, HCFC-123 353-36-6, HFC-161 354-33-6, HFC-125 355-25-9, Perfluorobutane 359-35-3, HFC-134 420-45-1, 2,2-Difluoropropane 420-46-2, HFC-143a 421-07-8, 1,1,1-Trifluoropropane 463-82-1, Neopentane 593-53-3, Methyl fluoride 811-97-2, HFC-134a 1717-00-6, HCFC-141b 2551-62-4, Sulfur hexafluoride 2837-89-0, HCFC-124 3955-25-7, Barium azodicarboxylate 7440-37-1, Argon, uses 7440-59-7, Helium, uses 7727-37-9, Nitrogen, uses 7732-18-5, Water, uses 10105-42-7, Trihydrazino triazine 10195-67-2 10396-10-8, p-Toluene sulfonyl semi-carbazine 26638-19-7, Dichloropropane 30143-46-5 42560-98-5, Dichlorohexafluoropropane 94458-04-5, Difluoropropane  
RL: NUU (Other use, unclassified); USES (Uses)  
(blowing agent; foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT 1109-15-5, Tris(pentafluorophenyl)borane  
RL: CAT (Catalyst use); USES (Uses)  
(cocatalyst; foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT 25068-12-6P, Ethylene/styrene copolymer  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(foam; foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT 9003-53-6, Polystyrene  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(foam; foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT 223645-35-0P

RL: CAT (Catalyst use); IMF (Industrial manufacture); PREP (Preparation);  
USES (Uses)

(foams having increased heat distortion temperature from blends of alkenyl  
aromatic polymers)

IT 221527-94-2P 223645-36-1P 233674-45-8P 243458-96-0P 263713-70-8P

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT  
(Reactant or reagent)

(foams having increased heat distortion temperature from blends of alkenyl  
aromatic polymers)

IT 75-64-9, reactions 75-78-5, Dimethyldichlorosilane 235-92-7,  
1H-Cyclopenta[l]phenanthrene 18039-90-2, Titanium trichloride  
tetrahydrofuran complex (1:3)

RL: RCT (Reactant); RACT (Reactant or reagent)

(foams having increased heat distortion temperature from blends of alkenyl  
aromatic polymers)

RE.CNT 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; EP 0416815 A2 1990 CAPLUS

(2) Anon; EP 514828 1992 CAPLUS

(3) Anon; WO 9400500 1994 CAPLUS

(4) Anon; WO 9532095 1995 CAPLUS

(5) Anon; WO 9809999 1995 CAPLUS

(6) Brydson; Plastic Materials, 5th edition 1989, P426

(7) Canich; US 5055438 1991 CAPLUS

(8) Canich; US 5057475 1991 CAPLUS

(9) Canich; US 5096867 1992 CAPLUS

(10) Collins; US 4323528 1982

(11) Devore; US 5470993 1995 CAPLUS

(12) Frisch; Plastic Foams, Part II P544

(13) Hirosawa; US 4379859 1983 CAPLUS

(14) Imeokparia; US 5411687 1995 CAPLUS

(15) Imeokparia; US 5434195 1995 CAPLUS

(16) Imeokparia; US 5557896 1996

(17) Imeokparia; US 5693687 1997 CAPLUS

(18) Imeokparia; US 5784845 1998

(19) Imeokparia; US 5824710 1998 CAPLUS

(20) La Pointe; US 5189192 1993 CAPLUS

(21) La Pointe; US 5321106 1994 CAPLUS

(22) La Pointe; US 5721185 1998 CAPLUS

(23) Malone; US 4824720 1989

(24) Neithamer; US 5350723 1994 CAPLUS

(25) Neithamer; US 5399635 1995 CAPLUS

(26) Nickias; US 5347024 1994 CAPLUS

(27) Randall, J; Polymer Sequence Determination, Carbon 13 NMR Method 1977, P71

(28) Rosen; US 5374696 1994 CAPLUS

(29) Stevens; US 5064802 1991 CAPLUS

(30) Stevens; US 5132380 1992 CAPLUS

(31) Timmers; US 5703187 1997 CAPLUS

(32) Wiley; US 3573152 1971

(33) Yoshimura; US 4464484 1984 CAPLUS

(34) Zizsperger; US 3504068 1970 CAPLUS

L10 ANSWER 9 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1999:761046 CAPLUS

DN 132:3943

ED Entered STN: 02 Dec 1999

TI Enlarged cell foams from blends of alkenyl aromatic polymers and  
 $\alpha$ -olefin/vinyl or vinylidene interpolymers

IN Chaudhary, Bharat I.; Hood, Lawrence S.; Barry, Russell P.; Park, Chung P.

PA The Dow Chemical Company, USA

SO U.S., 16 pp.

CODEN: USXXAM

DT Patent

LA English

IC ICM C08J009-06  
 ICS C08J009-08; C08J009-10; C08J009-14  
 NCL 264053000  
 CC 38-3 (Plastics Fabrication and Uses)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5993707	A	19991130	US 1998-206028	19981204
	US 6355341	B1	20020312	US 1999-387014	19990831
	WO 2000034365	A2	20000615	WO 1999-US27178	19991116
	WO 2000034365	A3	20000914		
	W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
EP	1135431	A2	20010926	EP 1999-968043	19991116
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	TR 200102275	T2	20011221	TR 2001-200102275	19991116
	JP 2002531658	T2	20020924	JP 2000-586806	19991116
	NO 2001002693	A	20010723	NO 2001-2693	20010531
	US 2002155270	A1	20021024	US 2002-51695	20020118
PRAI	US 1998-206028	A3	19981204		
	US 1999-387014	A3	19990831		
	WO 1999-US27178	W	19991116		

AB This invention pertains to a composition and a process for preparing a closed cell

alkenyl aromatic polymer foam having enlarged cell size, comprising one or more alkenyl aromatic polymers, one or more substantially random interpolymers, one or more blowing agents having zero ozone depletion potential and optionally one or more co-blowing agents, and (or) nucleating agents and additives. This combination allows the manufacture of closed cell, low d. alkenyl aromatic polymer foams of enlarged cell size, when blowing agents of relatively high nucleation potential are employed. When such blowing agents are used with alkenyl aromatic polymers in the absence of the substantially random interpolymers, small cell foams result.

ST polyolefin large cell foams

IT Plastic foams

Polyolefins

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT Aluminoxanes

RL: CAT (Catalyst use); USES (Uses)

(iso-Bu Me, branched, cyclic and linear; Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT Polymerization catalysts

(metallocene; Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT 1109-15-5

RL: CAT (Catalyst use); USES (Uses)

(Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT 204201-36-5P 210286-57-0P 233674-45-8P 239805-86-8P

RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-98-6, Propane, uses 75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC-152a 77-92-9, Citric acid, uses 78-67-1, Aibn 78-78-4, Isopentane 80-17-1, Benzenesulfonyl hydrazide 106-97-8, Butane, uses 109-66-0, Pentane, uses 123-77-3, Azodicarbonamide 124-38-9, Carbon dioxide, uses 133-55-1 144-55-8, Sodium bicarbonate, uses 287-92-3, Cyclopentane 353-36-6, HFC-161 354-33-6, HFC-125 359-35-3, HFC-134 420-46-2, HFC-143a 463-82-1, Neopentane 811-97-2, HFC-134a 2551-62-4, Sulfur hexafluoride 3955-25-7, Barium azodicarboxylate 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 10105-42-7 10195-67-2 10396-10-8, p-Toluenesulfonyl semicarbazide

RL: NUU (Other use, unclassified); USES (Uses)

(Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT 9003-53-6, Polystyrene 25068-12-6, Styrene-ethylene copolymer

RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)

(Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT 14927-64-1 210286-58-1 210286-61-6

RL: RCT (Reactant); RACT (Reactant or reagent)

(Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

IT 210286-60-5P 221527-94-2P 221527-95-3P 223645-34-9P 223645-36-1P 243458-96-0P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(Enlarged cell foams from blends of alkenyl aromatic polymers and  $\alpha$ -olefin/vinyl or vinylidene interpolymers)

RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Anon; EP 0416815 1990 CAPLUS
- (2) Anon; EP 514828 1992 CAPLUS
- (3) Anon; WO 95/32095 1995 CAPLUS
- (4) Canich; US 5055438 1991 CAPLUS
- (5) Canich; US 5057475 1991 CAPLUS
- (6) Canich; US 5096867 1992 CAPLUS
- (7) Chaudhary; US 5776389 1998
- (8) Collins; US 4323528 1982
- (9) Devore; US 5470993 1995 CAPLUS
- (10) Hatano; US 3953558 1976 CAPLUS
- (11) Hirose; US 4379859 1983 CAPLUS
- (12) La Pointe; US 5189192 1993 CAPLUS
- (13) La Pointe; US 5321106 1994 CAPLUS
- (14) La Pointe; US 5721185 1998 CAPLUS
- (15) Malone; US 4824720 1989
- (16) Neithamer; US 5350723 1994 CAPLUS
- (17) Neithamer; US 5399635 1995 CAPLUS
- (18) Nickias; US 5347024 1994 CAPLUS
- (19) Rosen; US 5374696 1994 CAPLUS
- (20) Stevens; US 5064802 1991 CAPLUS
- (21) Stevens; US 5132380 1992 CAPLUS
- (22) Suh; US 4229396 1980
- (23) Suh; US 5489407 1996
- (24) Timmers; US 5703187 1997 CAPLUS
- (25) Wiley; US 3573152 1971
- (26) Zizlsperger; US 3504068 1970 CAPLUS

L10 ANSWER 10 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1999:614016 CAPLUS

DN 131:229866

ED Entered STN: 26 Sep 1999  
TI Open-cell polystyrene foams from interpolymer blends  
IN Park, Chung P.; Imeokparia, Daniel D.; Chaudhary, Bharat I.  
PA The Dow Chemical Company, USA  
SO PCT Int. Appl., 65 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C08J009-00

ICS C08L023-02; C08L025-00

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 29

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9947592	A1	19990923	WO 1999-US5706	19990315
	W:	AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
	CA 2324277	AA	19990923	CA 1999-2324277	19990315
	AU 9930919	A1	19991011	AU 1999-30919	19990315
	AU 747560	B2	20020516		
	US 6093752	A	20000725	US 1999-268585	19990315
	BR 9908944	A	20001114	BR 1999-8944	19990315
	EP 1068260	A1	20010117	EP 1999-912571	19990315
	R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, NL, SE, FI			
	TR 200002668	T2	20010221	TR 2000-200002668	19990315
	JP 2002506903	T2	20020305	JP 2000-536781	19990315
	TW 457265	B	20011001	TW 1999-88104081	19990601
	US 6174471	B1	20010116	US 2000-553306	20000420
	NO 2000004632	A	20001108	NO 2000-4632	20000915
PRAI	US 1998-78091P	P	19980316		
	US 1999-268585	A3	19990315		
	WO 1999-US5706	W	19990315		
AB	The title foam is formed from a blend of polystyrene and an ethylene-styrene interpolymer. The ethylene-styrene interpolymer functions as a cell opening agent, and is used to control the open cell content of the resulting foam, which may contain >80 percent open cells. The foam is produced by an extrusion process in which CO2 is used as the preferred blowing agent. The resulting foams may be formed into beads, sheets, etc.				
ST	polystyrene open cellular foam; ethylene styrene open cellular foam; interpolymer polystyrene blend foam; metallocene catalyst polystyrene blend foam				
IT	Blowing agents				
	(Open-cell polystyrene foams from interpolymer blends)				
IT	Carbon black, uses				
	RL: NUU (Other use, unclassified); USES (Uses)				
	(Open-cell polystyrene foams from interpolymer blends)				
IT	Plastic foams				
	Polymer blends				
	Polyolefins				
	RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)				
	(Open-cell polystyrene foams from interpolymer blends)				
IT	Polymerization catalysts				
	(metallocene; Open-cell polystyrene foams from interpolymer blends)				
IT	204201-36-5P	210286-57-0P	210286-60-5P	210286-61-6P	210286-62-7P
	223645-35-0P	233674-45-8P			

RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation);  
USES (Uses)

(Open-cell polystyrene foams from interpolymer blends)

IT 124-38-9, Carbon dioxide, uses

RL: MOA (Modifier or additive use); USES (Uses)

(Open-cell polystyrene foams from interpolymer blends)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, Isopropanol,  
uses 71-23-8, Propanol, uses 71-55-6, 1,1,1-Trichloroethane  
74-82-8, Methane, uses 74-84-0, Ethane, uses 74-87-3,  
Methyl chloride, uses 74-98-6, Propane, uses 75-00-3, Ethyl  
chloride 75-09-2, uses 75-10-5, HFC-32 75-28-5, Isobutane  
75-37-6, HFC 152a 75-45-6, HCFC-22 75-68-3, HCFC-142b 75-69-4,  
CFC-11 75-71-8, CFC-12 75-73-0 76-13-1, CFC-113 76-14-2, CFC-114  
76-16-4 76-19-7, Perfluoropropane 77-92-9, uses 78-67-1, AIBN  
78-78-4, Isopentane 80-17-1, Benzenesulfonyl hydrazide 106-97-8  
, Butane, uses 109-66-0, Pentane, uses 115-25-3,  
Perfluorocyclobutane 123-77-3, Diazenedicarboxamide 144-55-8, Sodium  
bicarbonate, uses 287-92-3, Cyclopentane 306-83-2, HCFC-123  
353-36-6, Ethyl fluoride 354-33-6 355-25-9, Perfluorobutane  
359-35-3, HFC-134 420-45-1, 2,2-Difluoropropane 420-46-2, HFC 143a  
421-07-8, 1,1,1-Trifluoropropane 463-82-1, Neopentane 593-53-3, Methyl  
fluoride 811-97-2, HFC 134a 1717-00-6, HCFC-141b 2551-62-4,  
Sulfur hexafluoride 2837-89-0, HCFC-124 3851-16-9 3955-25-7  
7440-37-1, Argon, uses 7440-59-7, Helium, uses 7631-86-9, Silica, uses  
7727-37-9, Nitrogen, uses 7732-18-5, Water, uses 7782-42-5, Graphite,  
uses 10195-67-2 10396-10-8 13463-67-7, Titanium dioxide, uses  
14807-96-6, Talc, uses 26638-19-7, Dichloropropane 30143-46-5  
42560-98-5, DiChlorohexafluoropropane 94458-04-5, Difluoropropane  
RL: NUU (Other use, unclassified); USES (Uses)

(Open-cell polystyrene foams from interpolymer blends)

IT 9003-53-6, Polystyrene 25068-12-6, Ethylene-styrene copolymer  
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or  
engineered material use); USES (Uses)

(Open-cell polystyrene foams from interpolymer blends)

IT 886-65-7, 1,4-Diphenylbutadiene 14927-64-1 223645-34-9

RL: RCT (Reactant); RACT (Reactant or reagent)

(Open-cell polystyrene foams from interpolymer blends)

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Park, C; WO 9810014 A 1998 CAPLUS

L10 ANSWER 11 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1999:173670 CAPLUS

DN 130:302318

ED Entered STN: 17 Mar 1999

TI Solubility of gases in water: Correlation between solubility and the  
number of water molecules in the first solvation shell

AU Scharlin, Pirketta; Battino, Rubin; Silla, Estanislao; Tunon, Inaki;  
Pascual-Ahuir, Juan Luis

CS Department Chemistry, University Turku, Turku, FIN-20014, Finland

SO Pure and Applied Chemistry (1998), 70(10), 1895-1904

CODEN: PACHAS; ISSN: 0033-4545

PB Blackwell Science Ltd.

DT Journal

LA English

CC 68-1 (Phase Equilibria, Chemical Equilibria, and Solutions)

AB Using a new version of a program called GEPOL, a consistent set of values  
was computed for areas of three different kinds of surfaces for 53 gaseous  
solutes. These surface areas, together with the vols. of space enclosed  
by the surfaces, were studied. The following surfaces were identified:  
the van der Waals Surface (WS), the Solvent Accessible Surface (SAS) and  
the Solvent-Excluding Surface (SES). Values were determined for the number of  
water mols. (N) in the first solvation shell by a simple surface area  
approach from the SAS data. Values of N, as well as literature data on

solubilities of gases in water, were used to establish various semi-empirical correlations between thermodyn. changes on solution and the number of water mols. in the first solvation shell.

ST mol surface gas water soly; vol surface gaseous mol soly water; rare gas water soly; alkane haloalkane Freon gas water soly

IT Alkanes, properties  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (halo; solubility of gases in water and correlation between solubility and number of water mols. in first solvation shell)

IT Excluded volume  
 Hydration, chemical  
 Molar volume  
 (solvation shell studies for solubility of gases in water)

IT Gases  
 Hydration number  
 Molecular surface  
 Solubility  
 Solutes  
 (solubility of gases in water and correlation between solubility and number of water mols. in first solvation shell)

IT Alkanes, properties  
 Noble gases, properties  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (solubility of gases in water and correlation between solubility and number of water mols. in first solvation shell)

IT Entropy  
 Heat capacity  
 Hydration enthalpy  
 (thermodyn. characteristics of solubility of gases in water)

IT 109-66-0, n-Pentane, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (solubility of gases in water)

IT 74-82-8, Methane, properties 74-83-9, Bromomethane, properties  
 74-84-0, Ethane, properties 74-85-1, Ethene, properties  
 74-86-2, Acetylene, properties 74-87-3, Chloromethane, properties  
 74-98-6, Propane, properties 75-19-4, Cyclopropane  
 75-28-5, 2-Methylpropane 75-37-6, 1,1-Difluoroethane 75-43-4, Dichlorofluoromethane  
 75-45-6, Chlorodifluoromethane 75-46-7, Trifluoromethane 75-68-3, 1-Chloro-1,1-difluoroethane  
 75-69-4, Trichlorofluoromethane 75-71-8, Dichlorodifluoromethane 75-72-9, Chlorotrifluoromethane  
 75-73-0, Tetrafluoromethane 76-13-1, 1,1,2-Trichloro-1,2,2-trifluoroethane  
 76-14-2, 1,2-Dichloro-1,1,2,2-tetrafluoroethane 76-15-3, 1-Chloro-1,1,2,2,2-pentafluoroethane  
 76-16-4, Hexafluoroethane 106-97-8, n-Butane, properties  
 106-99-0, Butadiene, properties 115-07-1, Propene, properties  
 115-25-3, Octafluorocyclobutane 116-15-4, Hexafluoropropene 124-38-9, Carbon dioxide, properties  
 306-83-2, 1,1-Dichloro-2,2,2-trifluoroethane 354-33-6, 1,1,1,2,2-Pentafluoroethane  
 463-82-1, 2,2-Dimethylpropane 593-53-3, Fluoromethane 630-08-0, Carbon monoxide, properties  
 811-97-2, 1,1,1,2-Tetrafluoroethane 1333-74-0, Hydrogen, properties  
 1717-00-6, 1,1-Dichloro-1-fluoroethane 1794-84-9, Chloronitromethane  
 2551-62-4, Sulfurhexafluoride 2837-89-0, 1-Chloro-1,2,2,2-tetrafluoroethane  
 7439-90-9, Krypton, properties 7440-01-9, Neon, properties  
 7440-37-1, Argon, properties 7440-59-7, Helium, properties  
 7440-63-3, Xenon, properties 7727-37-9, Nitrogen, properties  
 7782-39-0, Deuterium, properties 7782-44-7, Oxygen, properties  
 10024-97-2, Nitrous oxide, properties 10028-15-6, Ozone, properties  
 10043-92-2, Radon, properties 10102-43-9, Nitric oxide,

properties 29759-38-4, Tetrafluoroethane

RL: PEP (Physical, engineering or chemical process); PRP (Properties);

PROC (Process)

(solubility of gases in water)

RE.CNT 47 THERE ARE 47 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

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AN 1998:333879 CAPLUS  
 DN 129:83616  
 ED Entered STN: 04 Jun 1998  
 TI Refrigerating apparatus  
 IN Mishina, Shotaro; Hara, Hideki; Ishia, Akira  
 PA Daikin Industries, Ltd., Japan  
 SO Jpn. Kokai Tokkyo Koho, 10 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 IC ICM C10M171-00  
 ICS C09K005-04; F25B001-00; C10N040-30  
 CC 51-8 (Fossil Fuels, Derivatives, and Related Products)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 10130685	A2	19980519	JP 1996-288419	19961030
PRAI	JP 1996-288419		19961030		

AB A refrigerating apparatus comprised of a refrigeration cycle containing cyclically connected compressor, condenser, throttling device, and evaporator uses hydrocarbon refrigerants and lubricating oils compatible with the hydrocarbon refrigerants. The apparatus provides improved refrigeration capacity for refrigeration systems and prevents the global warming.

ST refrigeration cycle refrigerant hydrocarbon lubricating oil

IT Lubricating oils  
 Refrigerants  
 Refrigerating apparatus  
 Refrigeration  
 (refrigerating apparatus using hydrocarbon refrigerants and lubricating oils compatible with them)

IT Naphthenic oils  
 Paraffin oils  
 RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)  
 (refrigerating apparatus using hydrocarbon refrigerants and lubricating oils compatible with them)

IT 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-85-1, Ethene, uses 74-98-6, Propane, uses 75-10-5, HFC 32, 75-19-4, Cyclopropane 75-28-5, 75-37-6, HFC 152a, 75-46-7, HFC 23, 78-78-4, 106-97-8, n-Butane, uses 109-66-0, n-Pentane, uses 115-07-1, 1-Propene, uses 287-23-0, Cyclobutane, 287-92-3, Cyclopentane 354-33-6, HFC 125, 420-46-2, HFC 143a, 811-97-2, HFC 134a, 7664-41-7, Ammonia, uses  
 RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)  
 (refrigerant; refrigerating apparatus using hydrocarbon refrigerants and lubricating oils compatible with them)

L10 ANSWER 13 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN  
 AN 1995:676110 CAPLUS  
 DN 123:86998  
 ED Entered STN: 14 Jul 1995  
 TI Component design issues and limitations with 3rd generation HFC, HC and natural refrigerants  
 AU Biancardi, F. R.; Sienel, T. H.; Sibley, Howard  
 CS United Technologies Research Center, East Hartford, CT, USA  
 SO Science et Technique du Froid (1994), (1, New Applications of Natural Working Fluids in Refrigeration and Air Conditioning), 365-86  
 CODEN: STFRD4; ISSN: 0151-1637  
 PB Institut International du Froid  
 DT Journal  
 LA English  
 CC 48-5 (Unit Operations and Processes)

AB Various benefits are examined and discussed of key Rankine cycle system and component design issues and limitations when using a wide range of single component refrigerants, hydrocarbons, natural refrigerants and blends by using computer modeling program, READER, for heating and cooling systems. The potential for using small high-speed centrifugal compressors to mech. these requirements and the state of the art are briefly described.

ST hydrocarbon refrigerant component design limitation; natural refrigerant component design limitation; computer program RADER refrigerant thermodyn cycle; heating cooling system refrigerant; air conditioning refrigerant thermodyn cycle

IT Hydrocarbons, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (component design issues and limitations with 3rd generation refrigerants)

IT Computer program  
 Thermodynamic cycle  
 (computer program READER for modeling of thermodyn. cycle of 3rd generation refrigerants)

IT Air conditioning  
 (heating and cooling; computer program READER for modeling of thermodyn. cycle of 3rd generation refrigerants)

IT Refrigeration  
 (agents, component design issues and limitations with 3rd generation refrigerants)

IT 74-98-6, r 290, properties 75-10-5, r 32, Refrigerant 75-19-4, Rc 270 75-28-5, r 600a 75-37-6, r 152a 75-43-4, r 21, Refrigerant 75-45-6, r 22 75-63-8, r 13B1 75-68-3, r 142b 75-69-4, r 11, Refrigerant 75-71-8, r 12, Refrigerant 76-13-1, r 113, Halocarbon 76-14-2, r 114, Halocarbon 76-15-3, r 115 76-19-7, r 218 78-78-4, Isopentane 106-97-8, r 600, properties 109-66-0, Pentane, properties 115-25-3, Rc 318 306-83-2, r 123 354-23-4, r 123a 354-33-6, r 125 359-35-3, r 134 420-46-2, r 143a 430-66-0, r 143 431-63-0, r 236Ea 431-89-0, r 227Ea 460-73-1, r 245Fa 677-56-5, r 236Cb 679-86-7, r 245Ca 690-39-1, r 236Fa 811-97-2, r 134a 1717-00-6, r 141b 1814-88-6, r 245Cb 2252-84-8, r 227Ca 2837-89-0, r 124 3257-28-1, e 125 7664-41-7, Ammonia, properties 7732-18-5, Water, properties 40723-63-5, r 254Cb 109207-22-9, e 134  
 RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (computer program READER for modeling of thermodyn. cycle of 3rd generation refrigerants)

L10 ANSWER 14 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1994:708824 CAPLUS

DN 121:308824

ED Entered STN: 24 Dec 1994

TI Reference data for the thermophysical properties of cryogenic fluids

AU Haynes, W.M.; Friend, D.G.

CS Thermophysics Division, National Institute of Standards and Technology, Boulder, CO, USA

SO Advances in Cryogenic Engineering (1994), 39(Pt. B), 1865-74

CODEN: ACYEAC; ISSN: 0065-2482

PB Plenum

DT Journal

LA English

CC 65-6 (General Physical Chemistry)

Section cross-reference(s): 48, 69

AB The Thermophysics Division of the National Institute of Stds. and Technol. (NIST) has long been involved in providing standard reference data for the thermophys. properties of cryogenic fluids. Comprehensive exptl. facilities have been used to provide accurate data for PVT relations, heat capacities, sound speeds, phase equilibrium, and transport properties for a

large variety of well characterized cryogenic fluid systems. A concurrent effort, in the areas of critical data evaluation, modeling, and theory, has allowed the Division to provide correlating equations, tabular material, and computer programs which have become an integral part of the nation's Standard Reference Data program. This critically evaluated information on the thermophys. properties of fluids and fluid mixts. of cryogenic interest is used for custody transfer applications and for efficient design and operation of cryogenic processes in the chemical, natural gas, aerospace, environmental, refrigeration, and other energy related industries. Available computer programs can calculate properties of pure fluids as well as provide predictions for fluid mixts.

- ST ref data thermophys property cryogenic fluid; equation state cryogenic fluid ref data; heat capacity cryogenic fluid ref data; phase equil cryogenic fluid ref data; thermal cond cryogenic fluid ref data; viscosity cryogenic fluid ref data; computer program thermophys property cryogenic fluid; database thermophys property cryogenic fluid; refrigerant thermophys property ref data
- IT Computer program  
(for thermophys. properties of cryogenic fluids by NIST)
- IT Cryogenic materials  
(reference data by NIST for thermophys. properties of)
- IT Equation of state  
(reference data for equation of state of cryogenic fluids by NIST)
- IT Heat capacity  
(reference data for heat capacity of cryogenic fluids by NIST)
- IT Sound and Ultrasound  
(reference data for sound velocity in cryogenic fluids by NIST)
- IT Thermal conductivity and conduction  
(reference data for thermal conductivity of cryogenic fluids by NIST)
- IT Thermal property  
(reference data for thermophys. properties of cryogenic fluids by NIST)
- IT Viscosity  
(reference data for viscosity of cryogenic fluids by NIST)
- IT Refrigeration  
(agents, reference data by NIST for thermophys. properties of)
- IT Equilibrium  
(liquid-vapor, reference data for liquid-vapor equilibrium of cryogenic fluids by NIST)
- IT Information science and technology  
(system, computerized, for thermophys. properties of cryogenic fluids by NIST)
- IT 74-82-8, Methane, properties 74-84-0, Ethane, properties 74-85-1, Ethylene, properties 74-98-6, Propane, properties 75-28-5, Isobutane 106-97-8, Butane, properties 124-38-9, Carbon dioxide, properties 630-08-0, Carbon monoxide, properties 1333-74-0, Hydrogen, properties 7440-37-1, Argon, properties 7440-59-7, Helium, properties 7440-63-3, Xenon, properties 7727-37-9, Nitrogen, properties 7732-18-5, Water, properties 7782-39-0, Deuterium, properties 7782-44-7, Oxygen, properties 7783-54-2, Nitrogen trifluoride  
RL: PRP (Properties)  
(reference data by NIST for thermophys. properties of)
- IT 75-10-5, R 32 (Refrigerant) 75-19-4, R 270 75-37-6, r 152a 75-43-4, R 21 (Refrigerant) 75-45-6 75-46-7, R 23 (Halocarbon) 75-63-8, r 13b1 75-68-3, r 142b 75-69-4, R11 75-71-8, R12 75-72-9, R 13 (Refrigerant) 75-73-0, R 14 (Refrigerant) 76-13-1, r 113 (Halocarbon) 76-14-2, r 114 (Halocarbon) 76-15-3, r 115 76-19-7, r 218 78-78-4, Isopentane 107-83-5, Isohexane 109-66-0, Pentane, properties 110-54-3, Hexane, properties 115-25-3, R 318 306-83-2, r 123 354-23-4, r 123a 354-33-6, r 125 359-35-3, r 134 420-46-2, r 143a 430-66-0, r 143 431-63-0, r 236Ea 431-89-0, r 227Ea 811-97-2, r 134a 1717-00-6, r 141b 1814-88-6, r 245Cb 2837-89-0, r 124 7664-41-7, Ammonia, properties 7783-06-4, Hydrogen

sulfide, properties 109207-22-9, e 134

RL: PRP (Properties)

(reference data by NIST for thermophys. properties of pure and mixts. of)

L10 ANSWER 15 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1994:704037 CAPLUS  
DN 121:304037  
ED Entered STN: 24 Dec 1994  
TI Fluoriodocarbon blends as CFC and Halon replacements  
IN Nimitz, Jonathan S.; Lankford, Lance H.  
PA USA  
SO PCT Int. Appl., 68 pp.  
CODEN: PIXXD2  
DT Patent  
LA English  
IC ICM C09K005-04  
ICS C09K003-30; A62D001-00; C08J009-14  
CC 48-5 (Unit Operations and Processes)  
Section cross-reference(s): 38, 50, 59  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9420588	A1	19940915	WO 1994-US2321	19940303
	W: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, UZ, VN				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	US 5611210	A	19970318	US 1993-27227	19930305
	CA 2157567	AA	19940915	CA 1994-2157567	19940303
	AU 9463587	A1	19940926	AU 1994-63587	19940303
	EP 687287	A1	19951220	EP 1994-910828	19940303
	EP 687287	B1	20000614		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				
	BR 9405991	A	19951226	BR 1994-5991	19940303
	CN 1122606	A	19960515	CN 1994-191986	19940303
	CN 1052031	B	20000503		
	JP 08507524	T2	19960813	JP 1994-520174	19940303
	RU 2140955	C1	19991110	RU 1995-121752	19940303
	AT 193903	E	20000615	AT 1994-910828	19940303
	US 5444102	A	19950822	US 1994-269324	19940630
	US 5605647	A	19970225	US 1994-268583	19940630
	US 5685915	A	19971111	US 1994-268587	19940630
	US 5674451	A	19971007	US 1995-401384	19950217
	US 5562861	A	19961008	US 1995-414566	19950331
	US 5716549	A	19980210	US 1996-701669	19960822
	US 5695688	A	19971209	US 1996-707960	19960910
PRAI	US 1993-27227	A	19930305		
	WO 1994-US2321	W	19940303		
	US 1995-414566	A3	19950331		
AB	The fluoriodocarbons are effective, environmentally safe, nonflammable, low-toxicity refrigerants, solvents, foam blowing agents, propellants, and fire fighting agents. The agents are clean, elec. nonconductive, and have short atmospheric lifetimes, zero ozone-depletion potential, and low global warming potentials. The agents comprise $\geq 1$ fluoriodocarbon satisfying the general formula: $\text{CaHbBrCldFeIfNgOh}$ , where a is 1-8; b is 0-2; c, d, g and h are each 0-1; e is 1-18; and f is 1-2, either neat or mixed with additives selected from the group consisting of alcs., esters, ethers, fluoroethers, hydrocarbons, hydrofluorocarbons, and perfluorocarbons.				
ST	fluoriodocarbon blend CFC Halon replacement; refrigerant fluoriodocarbon; fire extinguisher fluoriodocarbon; solvent fluoriodocarbon; foam blowing agent fluoriodocarbon; propellant fluoriodocarbon				

IT Propellants  
 Solvents  
 (fluoriodocarbon blends as CFC and Halon replacements)

IT Alcohols, uses  
 Esters, uses  
 Ethers, uses  
 Hydrocarbons, uses  
 Ketones, uses  
 Ligroine  
 Naphtha  
 Perfluorocarbons  
 Petroleum spirits  
 Stoddard solvent  
 Turpentine  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (fluoriodocarbon blends as CFC and Halon replacements)

IT Blowing agents  
 (foam; fluoriodocarbon blends as CFC and Halon replacements)

IT Refrigeration  
 (agents, fluoriodocarbon blends as CFC and Halon replacements)

IT Fire  
 (extinguishers, fluoriodocarbon blends as CFC and Halon replacements)

IT Hydrocarbons, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (fluoro, iodo; fluoriodocarbon blends as CFC and Halon replacements)

IT Ethers, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (fluoroalkyl, fluoriodocarbon blends as CFC and Halon replacements)

IT 60-29-7, uses 64-17-5, Ethanol, uses 67-56-1, Methanol, uses  
 67-63-0, 2-Propanol, uses 67-64-1, Acetone, uses 71-23-8, 1-Propanol,  
 uses 71-36-3, 1-Butanol, uses 71-41-0, 1-Pentanol, uses  
 74-98-6, Propane, uses 75-10-5, Difluoromethane 75-19-4,  
 Cyclopropane 75-21-8, Oxirane, uses 75-28-5, Isobutane  
 75-37-6 75-46-7, Trifluoromethane 75-56-9, uses 75-65-0,  
 2-Methyl-2-propanol, uses 75-73-0, Tetrafluoromethane 76-16-4,  
 Hexafluoroethane 76-19-7, Octafluoropropane 78-78-4, 2-Methylbutane  
 78-83-1, 2-Methyl-1-propanol, uses 78-92-2, 2-Butanol 78-93-3,  
 Butanone, uses 79-20-9, Methyl acetate 96-14-0, 3-Methylpentane  
 105-37-3, Ethyl propanoate 105-46-4, sec-Butyl acetate 105-54-4, Ethyl  
 butanoate 106-97-8, Butane, uses 107-08-4 108-08-7,  
 2,4-Dimethylpentane 108-20-3, Diisopropyl ether 108-21-4, Isopropyl  
 acetate 108-88-3, Toluene, uses 109-60-4, n-Propyl acetate  
 109-66-0, Pentane, uses 109-99-9, uses 110-19-0, Isobutyl  
 acetate 110-54-3, Hexane, uses 111-43-3, Di-n-propyl ether 111-65-9,  
 Octane, uses 111-84-2, Nonane 115-10-6, Dimethyl ether 115-25-3,  
 Octafluorocyclobutane 123-86-4, n-Butyl acetate 123-91-1, 1,4-Dioxane,  
 uses 124-18-5, Decane 138-86-3, Limonene 141-78-6, Acetic acid ethyl  
 ester, uses 142-82-5, Heptane, uses 142-92-7, Hexyl acetate  
 142-96-1, Di-n-butyl ether 287-23-0, Cyclobutane 335-58-0  
 354-33-6, Pentafluoroethane 354-41-6, 1,1,2,2-Tetrafluoro-1-  
 iodoethane 354-64-3, Pentafluoriodoethane 354-65-4,  
 1,1,2,2-Tetrafluoro-1,2-diiodoethane 355-25-9, Decafluorobutane  
 355-42-0, Tetradecafluorohexane 355-43-1, 1-Iodotridecafluorohexane  
 373-53-5, Fluoriodomethane 377-44-6 420-46-2, 1,1,1-Trifluoroethane  
 420-49-5, Chlorodifluoriodomethane 421-14-7, Methyl trifluoromethyl  
 ether 422-91-3, 1,1,2,2,3,3-Hexafluoro-1,3-diiodopropane 423-39-2,  
 Nonafluoro-1-iodobutane 425-82-1 431-89-0, 1,1,1,2,3,3,3-  
 Heptafluoropropane 463-82-1, 2,2-Dimethylpropane 507-63-1,  
 1-Iodoheptafluorooctane 542-69-8 554-12-1, Methyl propanoate  
 565-59-3, 2,3-Dimethylpentane 589-34-4, 3-Methyl hexane 623-42-7,  
 Methyl butanoate 628-21-7 628-63-7, n-Pentyl acetate 628-77-3  
 629-09-4 638-79-9, 1-Iodoperfluoropentane 677-69-0,  
 1,1,1,2,3,3,3-Heptafluoro-2-iodopropane 678-26-2, Dodecafluoropentane  
 679-86-7, 1,1,2,2,3-Pentafluoropropane 753-66-2,

Bromodifluoriodomethane 754-34-7, Heptafluoro-1-iodopropane  
811-97-2, 1,1,1,2-Tetrafluoroethane 931-91-9,  
Hexafluorocyclopropane 1120-21-4, Undecane 1184-76-5,  
Difluorodiodomethane 1330-16-1, Pinene 1479-49-8 1493-03-4,  
Difluoriodomethane 1561-52-0 1691-17-4, Bisdifluoromethyl ether  
1885-48-9 2314-97-8, Trifluoriodomethane 2356-61-8 3822-68-2,  
Pentafluorodimethyl ether 5764-87-4 6032-29-7, 2-Pentanol  
20705-05-9, 1,1,2-Trifluoro-1-iodoethane 22485-44-5,  
Iodopentafluorocyclopropane 53772-78-4  
RL: TEM (Technical or engineered material use); USES (Uses)  
(fluoriodocarbon blends as CFC and Halon replacements)

L10 ANSWER 16 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1994:138027 CAPLUS  
DN 120:138027  
ED Entered STN: 19 Mar 1994  
TI Flammability of alternate refrigerants  
AU Richard, Robert G.; Shankland, Ian R.  
CS Buffalo, NY, USA  
SO Actes Congr. Int. Froid, 18th (1991), Volume 2, 384-7 Publisher: 18th Int.  
Congr. Refrig., Saint-Hyacinthe, Que.  
CODEN: 59HQA7  
DT Conference  
LA English  
CC 48-5 (Unit Operations and Processes)  
AB The flammability properties of alternate refrigerants (pure substances and  
mixts.) being considered are determined using the ASTM E 681 method. The  
effects of ignition source, size of the vessel, moisture content of gas  
mixture, temperature, and mixture composition are discussed.  
ST flammability alternate refrigerant; HCFC refrigerant mixt flammability  
detn; HFC refrigerant flammability detn  
IT Flammability  
(determination of, for alternate refrigerants, by ASTM E 681 method)  
IT Refrigeration  
(agents, determination of flammability of pure or mixture, by ASTM E 681  
method)  
IT 74-82-8, Methane, properties 75-28-5, Isobutane  
106-97-8, Butane, properties 107-31-3, Methyl formate  
RL: PRP (Properties)  
(flammability of, determination of, by ASTM E 681 method)  
IT 75-45-6, HCFC 22 354-33-6, HFC 125 811-97-2, HFC 134a  
2837-89-0, HCFC 124  
RL: USES (Uses)  
(refrigerant mixts. containing, flammability of, determination of, by ASTM  
E 681  
method)  
IT 71-55-6, 1,1,1-Trichloroethane 74-98-6, Propane, uses 75-09-2,  
Methylene chloride, uses 75-68-3, R 142b 109-66-0, Pentane,  
uses 115-10-6, Dimethyl ether 353-36-6, R 161 430-66-0, R 143  
624-72-6, Freon 152 1717-00-6, R 141b 7664-41-7, Ammonia, uses  
RL: USES (Uses)  
(refrigerants, flammability of, determination of, by ASTM E 681 method)  
IT 75-10-5, R 32 (Refrigerant) 75-37-6, R 152a 420-46-2, R 143a  
RL: USES (Uses)  
(refrigerants, pure or mixts., flammability of, determination of, by ASTM E  
681  
method)

BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

AU 2001093146      A5      20020408      AU 2001-93146      20010927

PRAI US 2000-235847P      P      20000927

WO 2001-US30276      W      20010927

AB      Invention provides fluorocarbon refrigerant compns. that offer  
alternatives, and are considered environmentally safe substitutes, for  
CFC's and HCFC's. The compns. of the invention are useful as  
refrigerants, including for use in chillers, aerosol propellants, metered  
dose inhalers, heat transfer media, gaseous dielects., fire extinguishing  
agents, foam blowing agents, solvents and sterilants. The compns. of the  
invention are soluble in lubricating oils and are, therefore, particularly  
useful as R-22 retrofit fluids.

ST      safe fluorocarbon refrigerant compn

IT      Aerosols  
          (Propellants; fluorocarbon refrigerant compns.)

IT      Propellants (sprays and foams)  
          (aerosol; fluorocarbon refrigerant compns.)

IT      Hydrocarbons, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
          (fluoro; fluorocarbon refrigerant compns.)

IT      Blowing agents  
          Electric insulators  
          Fire extinguishers  
          Foams  
          Refrigerants  
          (fluorocarbon refrigerant compns.)

IT      Paraffin oils  
RL: TEM (Technical or engineered material use); USES (Uses)  
          (fluorocarbon refrigerant compns.)

IT      Polyisocyanurates  
          Polyurethanes, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
          (foams; fluorocarbon refrigerant compns. for)

IT      182971-48-8, R 414A  
RL: TEM (Technical or engineered material use); USES (Uses)  
          (R 414B, refrigerant; fluorocarbon refrigerant compns.)

IT      158675-81-1, R 409A  
RL: TEM (Technical or engineered material use); USES (Uses)  
          (refrigerant, R 409B; fluorocarbon refrigerant compns.)

IT      158675-80-0, R 508A  
RL: TEM (Technical or engineered material use); USES (Uses)  
          (refrigerant, R 508B; fluorocarbon refrigerant compns.)

IT      74-87-3, Chloromethane, uses      75-09-2, Dichloromethane, uses      76-16-4,  
Hexafluoroethane  
RL: TEM (Technical or engineered material use); USES (Uses)  
          (refrigerant, solubilizing agent; fluorocarbon refrigerant compns.)

IT      75-10-5, Difluoromethane      75-43-4, Dichlorofluoromethane      75-45-6,  
Chlorodifluoromethane      75-46-7, Trifluoromethane      75-68-3,  
1,Chloro-1,1-difluoroethane      75-69-4, Trichlorofluoromethane      75-71-8,  
Dichlorodifluoromethane      75-72-9, Chlorotrifluoromethane      75-73-0,  
Tetrafluoromethane      76-13-1      76-14-2, 1,2-Dichloro-1,1,2,2-  
tetrafluoroethane      76-15-3      76-19-7, Octafluoropropane      115-25-3,  
Octafluorocyclobutane      306-83-2, 2,2-Dichloro-1,1,1-trifluoroethane  
354-25-6, 1-Chloro-1,1,2,2-tetrafluoroethane      354-33-6,  
Pentafluoroethane      406-58-6, 1,1,1,3,3-Pentafluorobutane      420-46-2,  
1,1,1-Trifluoroethane      430-66-0      431-89-0, 1,1,1,2,3,3,3-  
Heptafluoropropane      460-73-1, 1,1,1,3,3-Pentafluoropropane      593-53-3,  
Fluoromethane      593-70-4, Chlorofluoromethane      690-39-1,  
1,1,1,3,3,3-Hexafluoropropane      811-97-2,  
1,1,1,2-Tetrafluoroethane      1717-00-6, 1,1-Dichloro-1-fluoroethane  
39432-81-0, R-502      50815-73-1, R-503      56275-41-3, R-500      56275-42-4,  
R-505      56275-43-5, R-506      57197-42-9, R 400      60382-53-8, R-504  
70281-30-0, R 501      133023-17-3, R-410A      146732-63-0, R-401A  
149437-06-9, R-402A      149437-07-0, R-403B      150621-87-7, R-507A

MS 652676P

(Uses)

(modeling of enthalpy and entropy of pure and mixed halogenated alkane refrigerants with corresponding states method)

RE.CNT 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD  
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DN 136:296540

ED Entered STN: 05 Apr 2002

TI Fluorocarbon refrigerant compositions

IN Singh, Rajiv R.; Spatz, Mark W.; Richard, Robert G.; Thomas, Raymond G.; Wilson, David P.

PA Honeywell International Inc., USA

SO PCT Int. Appl., 21 pp.

CODEN: PIXXD2

DT Patent

LA English

IC C09K005-04

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)

FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002026913	A2	20020404	WO 2001-US30276	20010927
	WO 2002026913	A3	20020530		
	W:	AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,			